

Patent Claims

1. A grounding key detection circuit for interference-proof detection of the operation of a grounding key in a telephone comprising:
a longitudinal current detection device (4) for detecting a longitudinal current flowing when the grounding key (6) is operated,
a comparator (6) for comparing the detected longitudinal current with at least one threshold value,
a monitoring circuit (8) for detecting an overshoot period for which the longitudinal current exceeds the current threshold value and for detecting an undershoot period for which the longitudinal current drops below the current threshold value, the monitoring circuit (8) outputting a grounding key detection signal when the overshoot period is greater than the undershoot period.
2. The grounding key detection circuit for interference-proof detection of the operation of a grounding key as claimed in claim 1, wherein the comparator (6) has a first comparator circuit (11) and a second comparator circuit (12), the first comparator circuit (11) being provided for comparing the detected longitudinal current with an upper current threshold value and the second comparator circuit (12) being provided for comparing the detected longitudinal current with a lower current threshold value, and wherein the monitoring circuit (8) detects the overshoot period and the undershoot period of the two current threshold values and outputs a grounding key detection signal when the overshoot period of the longitudinal current at the first comparator circuit (1) is greater than the undershoot period, or when the undershoot period of the longitudinal

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current at the second comparator circuit (12) is greater than the overshoot period.

- 5 3. The grounding key detection circuit as claimed in claim 1 or 2, wherein the monitoring circuit (8) contains at least one internal up/down counter which counts up after the upper current threshold value has been exceeded and counts down after the lower current threshold value has been undershot.
- 10 4. The grounding key detection circuit as claimed in one of claims 1 to 3, wherein the monitoring circuit (8) contains an internal up/down counter which counts up after the lower current threshold value has been undershot and counts down after the lower current threshold value has been exceeded.
- 15 5. The grounding key detection circuit as claimed in claim 3 or 4, wherein the internal counters perform the up/down counting processes for a predetermined adjustable counting period after the threshold values have been exceeded/undershot.
- 20 6. The grounding key detection circuit as claimed in claim 5, wherein the adjustable counting period corresponds to half the period of an interference signal which has a maximum interference period and/or minimum interference frequency, respectively.
- 25 7. The grounding key detection circuit as claimed in claim 6, wherein the minimum interference frequency of the interference signal is $16 \frac{2}{3}$ Hz, 50 Hz, 60 Hz or 120 Hz.
- 30 8. The grounding key detection circuit as claimed in one of the preceding claims, wherein the upper current threshold value is about +17 mA and the lower current threshold value is about -17 mA.

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9. The grounding key detection circuit as claimed in claim 1 to 8, wherein the monitoring circuit (8) contains a current polarity detection device for detecting the polarity of the longitudinal current.
10. The grounding key detection circuit as claimed in claim 9, wherein the number of polarity changes of the longitudinal current is counted by an internal counter of the current polarity detection device and, when a predetermined adjustable threshold count is exceeded, an external alternating current detection signal is output by the current polarity detection device.
11. The grounding key detection circuit as claimed in claim 1 to 10, wherein the grounding key detection signal can only be output after a predetermined adjustable guard period has elapsed.
12. The grounding key detection circuit as claimed in claim 11, wherein the adjustable guard period is about 4 ms.
13. The grounding key detection circuit as claimed in claim 11 or 12, wherein the expiry of the adjustable guard period is detected by the internal up/down counters of the monitoring circuit (8).
14. The grounding key detection circuit as claimed in claim 1 to 13, wherein the longitudinal current detection device (4) is an integrated circuit for digital telephone switching (SLIC).
15. A method for the interference-proof detection of the operation of a grounding key in a telephone, comprising the following steps:

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- (a) detecting a longitudinal current flowing when the grounding key (6) is operated;
- (b) comparing the detected longitudinal current with a current threshold value;
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- (c) detecting an overshoot period, for the duration of which the longitudinal current exceeds the current threshold value, and an undershoot period, for the duration of which the longitudinal current drops below the current threshold value;
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- (d) outputting a grounding key detection signal when the overshoot period is greater than the undershoot period.
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16. The method as claimed in claim 15, wherein the grounding key detection signal is output when the overshoot period is greater than the undershoot period and additionally an adjustable guard period has elapsed.

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